REPUBLIC OF THE PHILIPPINES

EDICT OF GOVERNMENT

PNS/BFAD 06 (2006) (English): Thermally Processed Fish Products - Specifications

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PHILIPPINE NATIONAL STANDARD

PNS/BFAD 06:2006
ICS ICS 67.120.30

Thermally processed fish products – Specification

DEPARTMENT OF TRADE & INDUSTRY PHILIPPINES

BUREAU OF PRODUCT STANDARDS

Foreword

This project is composed of the Technical Working Group (TWG) of different agencies and industry groups namely the Industrial Technology Development Institute (ITDI) of the Department of Science and Technology (DOST), Bureau of Food & Drugs (BFAD) of the Department of Health (DOH), Bureau of Agriculture and Fisheries Product Standards (BAFPS), Bureau of Product Standards (BPS), Bureau of Export and Trade Promotions (BETP) and Food Products Division (FPD) of the Department of Trade and Industry (DTI), Philippine Chamber of Food Manufacturers Incorporated (PCFMI) and Integrated Food Manufacturers Association of the Philippines (INFOMAPP).

The Philippine Council for Industry and Energy Research (PCIERD) of the DOST is the financing agency while the Philippine Food Processors and Exporters Organization, Inc. (PHILIFOODEX) signifies as the collaborating agency and the Department of Food Science and Nutrition (FSN) of the College of Home Economics, University of the Philippines – Diliman Campus as the implementing agency.

The TWG's main task is to draft standards and codes of practice for identified ethnic food products which will be later adopted as national standards after a series of reviews and public consultation in coordination with the Bureau of Food and Drugs.

In the preparation of this standard, related Codex Alimentarius standards were considered.

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1 Scope

This standard shall apply to thermally processed fish products packed in brine or oil or other suitable packing medium. It does not apply to specialty products where fish content constitutes less than 50% m/m of the net content of the container.

2 Definition of terms

For the purpose of this standard, the following terms shall mean:

2.1
commercial sterility of thermally processed food
it is the condition achieved by application of heat, alone or in combination with other appropriate treatment, sufficient to render the food free from microorganisms capable of growing in the food at ambient conditions at which the food is likely to be held during distribution and storage

2.2
container
it is any form of packaging material, which completely or partially encloses the food (including wrappers). A container may enclose the food as a single item or several units or types of prepackaged food when such is presented for sale to the consumer

2.3
evisceration
it is the process of removing the entrails (internal organs/viscera) from the fish

2.4
food
it is any substance, whether processed, semi-processed or raw, which is intended for human consumption, and includes drink, chewing gum and any substance which has been used in the manufacture, preparation or treatment of "food" but does not include cosmetics or tobacco or substances used only as drugs

2.5
food additives
it is any substance not normally consumed as a food by itself and not normally used as a typical ingredient of the food, whether or not it has nutritive value, the intentional addition of which to food for a technological (including sensory) purpose in the manufacturing, processing, preparation, treatment, packaging, transport or holding of such food results or maybe reasonably expected to result (directly or indirectly) in its or its by-product becoming a component of (or otherwise affecting the characteristic of) such food

2.6
food standard
it is a regulatory guideline that defines the identity of a given food product (i.e. its name and the ingredients used for its preparation) and specifies the minimum quality factors and, when necessary, the required fill of the container. It may also include specific labeling requirements other than or in addition to the labeling requirements generally applicable to all prepackaged foods

2.7
current good manufacturing practices (cGMP)
it is a quality assurance system aimed at ensuring that products are consistently manufactured, packed or repacked or held to a quality appropriate for the intended use. It is thus concerned with both manufacturing and quality control procedures

2.8
hermetically sealed container
it is a container which is sealed air-tight to protect the contents against the entry of microorganisms during and after processing

2.9
ingredient
it is any substance including food additive, used as a component in the manufacture or preparation of a food and present in the final product in its original or modified form

2.10
label
it includes any tag, brand, mark, pictorial, or other descriptive matter, written, printed, marked, embossed or impressed on, or attached to the container

2.11
labeling
it is any written, printed or graphic matter (1) upon any article or any of its container or wrappers and/or (2) accompanying the packaged food

2.12
lot
it is food produced during a period of time and under more or less the same manufacturing condition indicated by a specific code

2.13
packaging
it is the process of packing that is part of the production cycle applied to a bulk product to obtain the finished product. Any material, including painted material, employed in the packaging of a product including any outer packaging used for transportation of shipment. Packaging materials are referred to as primary or secondary according to whether or not they are intended to be in direct contact with the product

2.14
packing medium
it is the medium in which the food is packed for preservation and added flavor

2.15
potable water
it is water fit for human consumption and potability determined by health authorities cited in Philippine National Standards for drinking water (PNS 991:1993 – Agricultural and Other Food Products – Bottled Drinking Water – Specifications)

2.16
processed food
refers to foods that have been subjected to some degree of processing (e.g. milling, drying, freezing, concentration and canning, etc), which partially or completely change the physico-chemical and/or sensory characteristics of the raw material

2.17
process schedule
it is the thermal process chosen by the processor for a given product and container size to achieve at least commercial sterility

2.18
thermal process
the heat treatment to achieve commercial sterility and is quantified in terms of processing time and temperature

3 Description of products

3.1 Product definition

3.1.1 Thermally processed fish products are prepared from the flesh or any edible part of fish of any of the appropriate species of fish listed in, but not limited to, Annex 1, and packed in hermetically sealed containers.

3.1.2 Head, gills, scales and tail may be completely removed. The fish may be eviscerated. If eviscerated, it shall be practically free from visceral parts other than roe, milt or kidney. If ungutted, it shall be practically free from undigested feed or used feed.

3.2 Process definition

The products shall be packed in hermetically sealed containers and shall have received a processing treatment sufficient to ensure commercial sterility.

3.3 Product styles

Product style must conform to the required fill-in weight, fillers may be added in discrete amounts, and may include:

3.3.1 Solid (skin-on or skinless)

Refers to fish cut into segments which are placed in the container. The proportion of free flakes or chunks shall not exceed 18% of the drained weight of the container.

For small varieties of fish, a piece is placed in the container whole, or may be beheaded and gutted. The tail may also be removed.

3.3.2 Chunk

Refers to the pieces of fish most of which have dimensions of not less than 1.2 cm in each direction and in which the original muscle structure is retained. The proportion of pieces of flesh of which the dimensions are less than 1.2 cm shall not exceed 30% of the drained weight of the container.

3.3.3 Flake or flakes

Refers to a mixture of particles and pieces of fish most of which have dimensions less than 1.2 cm in each direction but in which the muscular structure of the flesh is retained. The proportions of pieces of flesh of which the dimensions are less than 1.2 cm exceed 30% of the drained weight of the container.

3.3.4 Grated or shredded

Refers to a mixture of particles of cooked fish that have been reduced to a uniform size, in which particles are discrete and do not comprise a paste.

3.3.5 Any other presentation shall be permitted provided that it:

3.3.5.1 contains at least two pieces of fish in each container,

3.3.5.2 contains only one fish species,

3.3.5.3 is sufficiently distinctive from other forms of presentation laid down in this standard,

3.3.5.4 meets all other requirements of this standard, and

3.3.5.5 is adequately described on the label to avoid confusing or misleading the consumer.

4 Essential composition and quality factors

4.1 Raw materials

4.1.1 Basic ingredients

4.1.1.1 Fish

Thermally processed fish as defined in 3.1 shall be prepared from sound fish of species listed in, but not limited to Annex 1, and is of a quality fit to be sold fresh for human consumption.

4.1.1.2 Packing medium

The packing medium shall be of food grade quality and conform to all applicable food standards.

4.1.1.3 Other ingredients

All other ingredients used shall be of food grade quality and conform to all applicable food standards.

4.1.2 Packing medium

The packing medium prepared from one or more ingredients or in combination of these shall be classified accordingly and described as follows:

4.1.2.1 Water

Products packed in water with less than 4% salt and/or for lower grain (less than 10) vinegar-water mixture.

4.1.2.2 Brine

Products packed in a salt-water solution of 4% or more.

4.1.2.3 Vegetable oil

Products packed in vegetable oil. Vegetable oil to be used shall be clear, refined, deodorized and edible in conformity with all applicable food standards.

Other oils – All other food grade oils applicable for use as packing medium for fish and are compliant with all applicable food standards.

4.1.2.4 Tomato sauce/paste

It is the concentrated product prepared from the liquid extracted from mature, sound, whole tomatoes; the sound residue from preparing such tomatoes for canning; the residue from partial extraction of juice; reconstituted tomato paste (concentrated tomato juice containing not less than 24% by weight of natural tomato soluble solids); or any combination of these ingredients to which is added salt and spices. One or more nutritive sweetening ingredients, vinegar or vinegars, onion, garlic, or other vegetable flavoring ingredients may be added.

4.1.2.5 Other sauces

A thickened liquid made from acceptable food grade ingredients giving a characterizing flavor and odor to the product.

4.1.2.6 Marinades

A thin liquid made from acceptable food grade ingredients, usually containing a sweetener, an acid solution or an alcoholic solution, with or without spices, herbs, seasonings, vegetables and other condiments.

4.2 Quality criteria

4.2.1 General requirements

The end product shall be reasonably firm in texture and shall conform to product styles in 3.3. Flavor and color shall be characteristics of the species and free from objectionable flavor and odor.

4.2.2 Types of defects and tolerances

Certain common defects shall not be present in amounts greater than the following limitations:

4.2.2.1 Mechanical

Excessive trimmings including serious cuts on the surface of the units shall not exceed the maximum limit of 2 cuts per piece.

4.2.2.2 Foreign matter

The presence in the sample unit of any matter, which has not been derived from fish, does not pose a threat to human health and is readily recognized without magnification or is present at a level determined by magnification method or any equivalent methods that indicates non-compliance with good manufacturing practices and sanitation practices.

4.2.2.3 Odor/flavor/color

A sample unit affected by persistent and distinct objectionable odors or flavors indicative of decomposition or rancidity or by sulphide staining of the meat exceeding 5% of the drained contents.

4.2.3 Classification of "defectives"

A container that exceeds the tolerance limit set in 4.2.2 and has more than 2 types of defects specified shall be considered "defective".

4.2.4 Histamine content

The products shall not contain more than 10 mg/100 g of histamine based on the average of the sample unit tested but no sample shall exceed 20 mg/100g of histamine.

4.2.5 Lot acceptance

A lot will be considered as meeting the applicable quality requirements when the number of "defectives", as defined in 4.2.2, does not exceed the acceptance number (c) of the appropriate sampling plan.

5 Food additives

5.1 Food additives when used shall be in accordance with the current regulations of the Bureau of Food and Drugs (BFAD), and may include the following listed in the Table.

5.2 Others. All others not included in the above list shall be allowed as carry-over; provided they are approved by the BFAD Regulation on Food Additives and shall be in accordance to the *Principle Relating to the Carry-Over of Food Additives into Foods* of the Codex.

6 Contaminants

The product shall not exceed the following limits for heavy metal contaminants.

6.1	Lead	0.5 mg/kg (calculated as Pb)
6.2	Tin	250 mg/kg (calculated as Sn)
6.3	Mercury	0.1 mg/kg (calculated as methyl mercury)

7 Hygiene

7.1 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the Recommended International Code of Practice – General Principles of Food Hygiene (CAC/RCP 1 – 1969, Rev. 4 (2003)) and/or the A.O. No. 153 s. 2004 - Guidelines, Current Good Manufacturing Practices in Manufacturing, Packing, Repacking or Holding Food, A.O. 152 s. 2004 - Prescribing Regulations for Irradiated Food, and processed according to the Recommended code of practice for the processing and handling of thermally processed fish products (PNS/BFAD 07:2006).

7.2 When tested by appropriate methods of sampling and examination, the product:

7.1.1 Shall be free from filth that may pose a hazard to health;

7.1.2 Shall be free from parasites which may represent a hazard to health;

7.1.3 Shall not contain any substance originating from microorganisms in amounts which may represent a hazard to health;

7.1.4 Shall be free from microorganisms capable of development under normal conditions of storage; and

7.1.5 Shall be free from container integrity defects which may compromise the hermetic seal.

Table – Food additives list for thermally processed fish products

Additive	Maximum allowable level
Acidity regulators	
Acetic acid	GMP*
Lactic acid (L-, D- and DL-)	GMP*
Citric acid	GMP*
For bottled tuna and bonito only	
Disodium diphosphate	10mg/kg expressed as P_2O_5 (includes natural phosphate)
Modified starches	
Acid treated starches (including white and yellow dextrins)	GMP
Alkaline treated starches	GMP
Oxidized starches	GMP
Monostarch phosphate	GMP
Distarch phosphate, esterified	GMP
Acetylated distarch phosphate	GMP
Phosphated distarch phosphate	GMP
Starch acetate	GMP
Acetylated distarch adipate	GMP
Hydroxypropyl starch	GMP
Hydroxypropyl starch phosphate	GMP
Thickening or gelling agents (for use in packing media only)	
Alginic acid	GMP
Sodium alginate	GMP
Potassium alginate	GMP
Calcium alginate	GMP
Agar	GMP
Carrageenan and its Na, K, and NH_4 salts (including furcelleran)	GMP
Processed *Eucheuma* Seaweed (PES)	GMP
Carob bean gum	GMP
Guar gum	GMP
Tragacanth gum	GMP
Xanthan gum	GMP
Pectins	GMP
Sodium carboxymethylcellulose	GMP
Natural flavors	
Spice oils	
Spice extracts	GMP
Smoke flavors (Natural smoke solutions and extracts)	GMP

* **GMP** – The food additive must be used according to Good Manufacturing Practices (GMP), and its use self-limiting in food for technological, sensorial or other reasons thus need not be subjected to legal maximum limits.

8 Weights and measures

Fill of container

8.1 Minimum fill

The container shall be filled with fish and packing medium, and shall occupy not less than 90% of the water capacity of the container. The water capacity of the container is the volume of distilled water at 20°C, which the sealed container will hold when completely filled. A container that fails to meet the requirement for minimum fill (90% container capacity) shall be considered "slack filled".

8.2 Lot acceptance

A lot will be considered as meeting the requirement of 8.1 when the number of "slack filled" containers does not exceed the acceptance number of (c) of the appropriate sampling plan.

8.3 Minimum drained weight

The drained weight of the product shall not be less than 60% of the declared net weight.

9 Labeling

9.1 Each container shall be labeled and marked with the following information in accordance with current BFAD Labeling Regulation:

9.1.1 The name of the product shall be "[Name of fish used (common name and/or local name)] in [Packing medium]", ex. "*Bangus* (Milkfish) in Oil", in accordance with the customs or practices of the country in which the product is distributed. The scientific name of the fish may also be declared.

If the fish has been smoked, smoke-flavored, or have undergone other pre-processing treatments prior to thermal processing, this information shall appear on the label in close proximity to the name.

9.1.2 There shall appear on the label a reference to the product style in close proximity to the name of the product in such descriptive terms that will adequately and fully describe the nature of the presentation of the product to avoid misleading or confusing the consumer.

9.1.3 The name and address of the manufacturer and/or distributor of the food.

9.1.4 The list of ingredients and food additives used in the preparation of the product in descending order of proportion. The concentration of preservatives added shall be specified.

9.1.5 The net content by weight in the metric system. Other systems of measurement required by importing countries shall appear in parenthesis after the metric system unit.

9.1.6 Open date marking

The words "Best/Consume Before", "Use by ___", followed by the date, month and year indicating end of period at which the product shall retain its optimum quality attributes at defined storage conditions.

9.1.7 Lot or code number identifying product lot.

9.1.8 The words "Product of the Philippines", or the country of origin if imported.

9.2 Nutrition labeling

Shall conform to BFAD regulations on nutrition labeling.

10 Methods of analysis and sampling

10.1 Method of sampling

Sampling shall be in accordance with the FAO/WHO Codex Alimentarius Sampling Plans for Prepackaged Foods - CAC/RM 42-1969, Codex Alimentarius Volume 13, 1994 (Annex 2).

10.2 Determination of lead using atomic absorption spectrophotometer

According to the AOAC Official Methods of Analysis, Method No. 972.25, 16th ed., 1995 (Annex 5).

10.3 Determination of tin using atomic absorption spectrophotometer

According to the AOAC Official Methods of Analysis, Method No. 985.16, 16th ed., 1995 (Annex 6).

10.4 Determination of drained weight

According to Codex Standard 70-1981, Revision 1-1995. p.5. (Annex 7).

10.5 Determination of net weight and washed drained weight

According to Codex Standard 70-1981, Revision 1-1995. p.5. (Annex 8 A and 8 B).

10.6 Determination of presentation

According to Codex Standard 70-1981, Revision 1-1995. p.6. (Annex 9).

10.7 Determination of histamine – Flourimetric method

According to AOAC Official Method of Analysis, Method 977.13, 15th ed., 1990.

Annex 1

Species of fish utilized in the production of thermally processed fish*

	Scientific name	English name	Common local name
A. Marine species			
Sardines and sardine-like fishes (Family clupidae)			
1.	*Amblygaster leiogaster*	Smooth belly sardinella	*Tamban, tamban-tuloy*
2.	*Amblygaster lsirm*	Spotted sardinella	*Tamban, tunsoy*
3.	*Anodontostoma chacunda*	Chacunda gizzard shad	*Kabasi*
4.	*Dussumieria acuta*	Rainbow sardines	*Tulis*
5.	*Dussmieria ellipsoides*	Slender rainbow herring	*Tamban*
6.	*Escualosa thoracata*	White sardines	*Bolinaw*
7.	*Herklotsichthys dispilonotus*	Black saddle herring	*Manamsi (Palawan)*
8.	*Herklotsichthys punctatus*	Spot back herring	*Dilat*
9.	*Pellona ditchela*	Indian pellona	*Ibis*
10.	*Sardinella albella*	White sardinella	*Tunsoy, tabagak*
11.	*Sardinella aurita*	Round sardinella	*Lapad*
12.	*Sardinella brachysoma*	Deep-body sardinella	*Lapad*
13.	*Sardinella fimbriata*	Fringe scale sardinella	*Tunsoy, silinyasi, tabagak*
14.	*Sardinella gibbosa*	Gold stripe sardines	*Tunsoy, silinyasi, tamban*
15.	*Sardinella jussieu*	Mauritian sardinella	*Tamban*
16.	*Sardinella longiceps*	Indian oil sardines	*Tamban, turay (P)*
17.	*Sardinella melanura*	Black tip sardines	*Tamban, tunsoy*
18.	*Sardinella tawilis*	Fresh water sardinella	*Tawilis*
19.	*Spratelloides delicatudus*	Delicate round herring	*Dilis bahura*
20.	*Spratelloides gracilis*	Silver striped round herring	*Mangsi, libod*

* Other species of fish not listed above may also be used provided that it conforms to standards stated herein.

	Scientific name	English name	Common local name
Tuna and mackerel (Family scombridae)			
1.	*Auxis rochei*	Bullet tuna	*Tulingan*
2.	*Auxis thazard*	Frigate tuna	*Tulingan*
3.	*Cybiosarda elegans*	Leaping bonito	*Sanbagon (Surigao sur)*
4.	*Euthynnus affinis*	Kawa-kawa	*Katchorita*
5.	*Euthynnus yaito*	Eastern little tuna	*Bonito/Katchorita*
6.	*Grammatocynus bicariantus*	Shark mackerel	*Lamhu-an*
7.	*Grammatocynus bulineatus*	Double lined mackerel	*Lamhu-an*
8.	*Gymnosarda unicolor*	Dogtooth tuna	*Lamhu-an*
9.	*Katsuwonus pelamis*	Skipjack tuna	*Gulyasan*
10.	*Rastrelliger brachysoma*	Short mackerel	*Hasa-hasa*
11.	*Rastrelliger faugni*	Island mackerel	*Alumahan, hasa-hasa*
12.	*Rastrelliger kanagurta*	Indian mackerel	*Hasa-hasa, alumahan, burao*
13.	*Scomber australasicus*	Blue mackerel	*Alumahan, saramulyete*
14.	*Scomberomorus commerson*	Indo-pacific king mackerel	*Bangkulis*
15.	*Scomberomorus guttatus*	Narrow-barred Spanish mackerel	*Tanigue*
16.	*Scomber japonicus*	Chub mackerel	*Alumahan, saramulyete*
17.	*Scomberomorus munroi*	Australian spotted mackerel	*Bariles*
18.	*Sarda orientalis*	Striped bonito	*Tambacol*
19.	*Sarda sarda*	Atlantic bonito	*Tambacol*
20.	*Scomberomorus semifaciatus*	Broad barred king mackerel	*Tanigue*
21.	*Thunnus albacares*	Yellow fin tuna	*Tambacol, bariles*
22.	*Thunnus obesus*	Big-eye tuna	*Bagok (p)*
23.	*Thunnus tonggol*	Long-tail tuna	*Bariles*
Other fishes			
1.	*Acanthurus bleekeri*	Ringtail Surgeon fish	*Labahita*
2.	*Anguilla japonica*	Japanese eel	*Igat*
3.	*Arius manillensis*	Manila sea catfish	*Kanduli*
4.	*Caesio caerulaurea*	Blue and gold fusiliier	*Dalagang bukid*
5.	*Caranx sexfasciatus*	Big-eye trevally	*Talakitok*
6.	*Decapterus macarellus*	Mackerel scad	*Galunggong*
7.	*Decapterus macrosoma*	Round scad, short finned scad	*Galunggong*

* Other species of fish not listed above may also be used provided that it conforms to standards stated herein.

	Scientific name	English name	Common local name
8.	*Elegatis bipinulata*	Rainbow runner	*Salmon*
9.	*Encrasicholina oligobranchus*	Philippine anchovy	*Dilis*
10.	*Engraulis japonicus*	Japanese anchovy	*Dilis*
11.	*Epinephelus corallicola*	Spotted grouper	*Lapu-lapu*
12.	*Leingathus equulus*	Common pony fish	*sapsap*
13.	*Makaira mazara*	Indo-pacific blue marlin	*Malasugi (P)*
14.	*Mugil cephalus*	Flathead grey mullet	*Banak*
15.	*Mugil melinopterus*	Black-finned mullet	*Kapak*
16.	*Nemipterus balinensis*	Balinese threadfin bream	*Bisugo*
17.	*Nemipterus taeniopterus*	Threadfin bream	*Bisugo*
18.	*Polynemus microstoma*	Small mouthed threadfin	*Mamaleng bato*
19.	*Saurida tumbil*	Greater lizardfish	*Kalaso*
20.	*Selar crumenopthalmus*	Big-eyed scad	*Matangbaka*
21.	*Selaroides leptolepsis*	Yellow stripe scad	*Salay-salay, salay-salay ginto*
22.	*Siganus canaliculatus*	White spotted spine foot	*Samaral, danggit*
23.	*Siganus coralillinus*	Rabbit fish	*Samaral, danggit*
24.	*Sillago sihama*	Silver sillagao	*Asohos*
25.	*Sphyraena barracuda*	Great barracuda	*Baracuda*
26.	*Sphyraena obstusata*	Obtuse/stripped barracuda	*Torsillo*
27.	*Stolephorus comersonii*	Commerson's anchovy	*Dilis, bolinao*
28.	*Stolephorus indicus*	Indian anchovy	*Tuakang*
29.	*Trichiurus haumela*	Hair tail	*Balila/Espada*
B.	**Fresh water species**		
1.	*Chanos chanos*	Milkfish	*Bangos*
2.	*Clarias batrachus*	Catfish	*Hito*
3.	*Opicephalus striatus*	Murrel/mud fish	*Dalag/Bulig*
4.	*Osphronemus goramy*	Gourami	*Gourami*
5.	*Tilapia mossambica*	Tilapia	*Tilapia*

* Other species of fish not listed above may also be used provided that it conforms to standards stated herein.

Reference:

1. Avery, A.C. 1950. **Fish Processing Handbook of the Philippines.** US Government Printing Office: Washington, D.C.
2. Ganaden, S.R and F. Lavapie. 1999. **Common and Local Names of Marine Fishes of the Philippines**. Bureau of Fisheries and Aquatic Resources, Philippines. 386 p.
3. Gonzalez, B. 2000. **Palawan Foodfishes**. Palawan Sustainable Development Communications. 82 p.

Annex 2

FAO/WHO Alimentarius sampling plan for prepackaged foods (AQL=6.5) CAC/RM 42-1969

1 Scope

The Sampling Plans in Annex 3 of this document apply to the acceptance of defective units (defectives) in lots of prepackaged foods, as defined in individual Codex Standards, insofar as the Sampling Plans have been specifically included in such Codex Standards for the purpose of determining the acceptability or otherwise of the lot. They shall be used in accordance with the provisions dealing with the classification of defectives and lot acceptance in Codex Standards to which these Sampling Plans are stated to apply and within the limits of Clause 2 of this document.

2 Field of application

2.1 Type of examination to which the sampling plans apply

The sampling plans in Annex 3 of this document are intended primarily to cover the quality provisions of Codex Commodity Standards where an AQL of 6.5 is appropriate for the defective unit as defined in Codex Standards. For the purposes of these Sampling Plans, "quality" refers to those factors or product characteristics which are evaluated by sensory or physical means, such as colour, flavor, texture, defects, size and appearance. They are not intended however, to cover factors which may represent a hazard to health or which are unwholesome or otherwise highly objectionable to the consumer on the basis of which responsible authorities would reject the lot. Examples of these latter categories are pesticide residues, contaminants, blown cans, foreign material such as stones and large insects. Other criteria and sampling plans must be used in dealing with factors of this type. While these Sampling Plans are intended primarily for quality evaluation, they may be found suitable for other determinations such as net weight, Brix values and drained weight, provided an acceptance criterion with an AQL of 6.5 is appropriate for these determinations. In this case a definition of "defective" for the specific determination under consideration would be required in the respective Codex Standard.

2.2 Size of lot and point of application

The sampling plans and acceptance procedures contained in this document are designed to cover lots that represent substantial portions of factory production or relatively large block of merchandise. The plans may also be used for small lots, but Governments may elect to use sampling procedures of their own choosing for enforcement at the retail level. This is done in recognition of the high ratio of sample size to lot size when dealing with small lots and the probability that once the production of defective or non-conforming product is no longer likely to be uniform between and within the smaller lots.

2.3 Principles of acceptance sampling

For detailed explanation of the statistical basis for these Sampling Plans, see Annex 4 of this document.

3 Description

The sampling plans – Annex 3 of this document – are a tabular presentation appropriate for acceptance sampling of prepackaged foods where an AQL of 6.5 has been accepted for certain products characteristics. The plans include:

1. Inspection Levels;
2. Sample sizes in relation to lot size and container size; and
3. Acceptance numbers.

A sample is drawn from the lot according to the appropriate schedule in the Sampling Plans. Each sample unit is examined according to the requirements of the individual Codex Standard and classified as either "acceptable" or as "defective". Based on the total number of "defectives" in the sample, the lot either "meets" or "fails" the requirements of the Codex standard, to which these Sampling Plans apply, according to the following criteria:

- Meets if the number of "defectives" is equal to, or less than, the acceptance number of the appropriate plan.
- Fails if the number of "defectives" exceeds the acceptance number of the appropriate plan.

4 Definitions

4.1 Acceptable quality level (AQL)

The maximum percent defective units (defectives) permitted in a lot which will be accepted approximately 95% of the time. For example, a sampling plan at an AQL of 6.5 will accept a lot or production which has 6.5 percent defective approximately 95 percent of the time.

4.2 Acceptance number (c)

The number in a sampling plan which indicates the maximum number of defectives permitted in the sample in order to consider the lot as meeting the requirements of a Codex Standard.

4.3 Buyer's risk

The risk a buyer takes that a lot will be accepted on the basis of these Sampling Plans even though such a lot may fail to conform to the requirements of the Codex Standard.

4.4 Producer's risk

The risk a producer takes that a lot will fail on the basis of these Sampling Plans even though such a lot in reality may meet the requirements of the Codex Standard.

4.5 Defective

A "defective" is a sample unit which does not conform with a certain specified requirement (or requirements) of a Codex Standard (on the basis of total "demerit points", individual tolerances for "defects", etc.). The criteria on the basis of which a sample unit is classified as "defective" are specified in individual Codex standards to which these Sampling Plans apply (see also 2.1 and 2.2 of this document). Although a defective is a sample unit which fails to meet certain specified requirements in Codex standards, it does so only to an extent which is slightly below those requirements and which would not make the product objectionable to the consumer as specified in Clause 2 – Field of Application, 2.1.

4.6 Inspection

The process of measuring, examining, testing or otherwise comparing a container or unit of product (sample unit) with the requirements of a Codex standard.

4.7 Inspection level

The term used to indicate the relative amount of sampling performed on lots of a given product or class of products.

4.8 Lot or inspection lot

Collection of primary containers, or sample units, of the same size, type and style which have been manufactured or processed under essentially the same conditions.

4.9 Lot size (N)

The number of primary containers, or sample units, in the lot.

4.10 Sample unit

The individual container (primary container), a portion of the contents of the primary container or a composite mixture of product that is examined or tested as a single unit.

4.11 Sample

Any number of sample units which are used for inspection. Generally the sample comprises all of the containers or sample units drawn for examination or testing purposes from a particular lot.

4.12 Sampling

The process of drawing or selecting containers or sample units from a lot or production.

4.13 Sample size (n)

The number of containers, or sample units comprising the total sample drawn from a lot or production.

4.14 Sampling plan

A sampling scheme which includes sample size, inspection levels, acceptance and/or rejection numbers so that a decision can be made to accept or reject the lot or production based on the results of inspection and testing of the sample.

5 Application of the sampling plans

5.1 Information required

In using the sampling plans in Annex 3 of this document, the following information shall be known:

a. Container size (net weight in kg or lb)
b. Inspection level (see sub-section 4.7)
c. Lot size (N) (see sub-section 4.9)
d. Requirements of the Codex Standard with respect to product quality (i.e. classification of defectives and requirements for acceptance of the lot).

5.2 Inspection

The following steps are taken:

a. The appropriate inspection level is selected as follows:

Inspection Level I - Normal sampling
Inspection Level II - Disputes (Codex referee purposes sample size), enforcement or need for better lot estimate.

b. Determine the lot size (N), i.e. number of primary containers or sample units.

c. Determine the number of sample units (sample size (n)) to be drawn from the inspection lot, consideration being giving to container size, lot size, and inspection level.

d. Draw at random the required number of sample units from the lot giving proper consideration to code or other identifying marks in selection of the sample.

e. Examine the product in accordance with the requirements of the Codex Standard. Classify any container or sample unit which fails to meet the specified quality level of the standard as a defective on the basis of the classification of defectives contained in the Codex Standard.

f. Refer to the appropriate Sampling Plan in Appendix I.

g. Consider the lot acceptable if the number of defectives is equal to or less than the acceptance number (c) of the appropriate sampling plan contained in Appendix I of this document.

h. Consider the lot as failing if the number of defectives exceeds the acceptance number (c) of the appropriate sampling plan contained in Appendix I of this document.

5.3 Examples for the application of the sampling plans

a. **Inspection level I** (see 5.2 (a))

A lot consists of 1200 cases, packed in 12 x 2.5 lb primary containers per case. A decision is made to use Inspection Level I since the goods are not in dispute and there is no history of controversy over quality. A container is defined in the Codex Standards or is taken to be the sample unit.

Lot size (N)	=	1200 x 12 or 14,400 units
Container size	=	2.5 lb
Inspection level	=	I (see sampling plan 1, Appendix II)
Sample size (n)	=	13
Acceptance number (c)	=	2

In this example if there are no more than two (2) "defectives" in a sample size of 13 containers the lot is considered acceptable. If, however, there are three (3) or more "defectives" in the sample the lot is considered as failing to meet the requirements. A "defective" as used in the sampling plans is defined in the Codex Standard.

b. **Inspection level II** (see 5.2 (a))

If in the foregoing example (5.3 (a)) the quality of the goods is in dispute and a referee method is required for the examination or re-examination of the lot, an increased sample size is taken at Inspection Level II, selecting at least 21 containers.

Lot size (N)	=	1200 x 12 or 14,400 units
Inspection level	=	II (see sampling Plan 2, Appendix II)
Sample size (n)	=	21
Acceptance number (c)	=	3

5.4 Notes on sample size

It is not necessary to restrict the sample size to the minimum corresponding to the appropriate lot size and inspection level. In all cases a larger sample may be drawn. In the example at 5.3 (b) an even more reliable estimate of lot quality could be made by taking a sample of 29 or even 48 and applying the corresponding acceptance numbers of 4 and 6 respectively.

Annex 3

1 Sampling plan 1 (Inspection level I, AQL = 6.5)

1.1 Net weight is equal to or less than 1 kg (2.2 lb)

Lot size (N)	Sample size (n)	Acceptance no. (c)
4,800 or less	6	1
4,801 –24,000	13	2
24,001 – 48,000	21	3
48,001 – 84,000	29	4
84,001 – 144,000	48	6
144,001 – 240,000	84	9
More than 240,000	126	13

1.2 Net weight is greater than 1 kg (2.2 lb) but not more than 4.5 kg (10 lb)

Lot size (N)	Sample size (n)	Acceptance no. (c)
2,400 or less	6	1
2,841 –15,000	13	2
15,001 – 24,000	21	3
24,001 – 42,000	29	4
44,001 – 72,000	48	6
72,001 – 120,000	84	9
More than 120,000	126	13

1.3 Net weight greater than 4.5 kg (10 lb)

Lot size (N)	Sample size (n)	Acceptance no. (c)
600 or less	6	1
601 –2,000	13	2
2,001 – 7,200	21	3
7,201 – 15,000	29	4
15,001 – 24,000	48	6
24,001 – 42,000	84	9
More than 42,000	126	13

2 Sampling plan 2 (Inspection level II, AQL = 6.5)

2.1 Net weight is equal to or less than 1 kg (2.2 lb)

Lot size (N)	Sample size (n)	Acceptance no. (c)
4,800 or less	13	2
4,801 –24,000	21	3
24,001 – 48,000	29	4
48,001 – 84,000	48	6
84,001 – 144,000	84	9
144,001 – 240,000	126	13
More than 240,000	200	19

2.2 Net weight is greater than 1 kg (2.2 lb) but not more than 4.5 kg (10 lb)

Lot size (N)	Sample size (n)	Acceptance no. (c)
2,400 or less	13	2
2,841 –15,000	21	3
15,001 – 24,000	29	4
24,001 – 42,000	48	6
44,001 – 72,000	84	9
72,001 – 120,000	126	13
More than 120,000	200	19

2.3 Net weight greater than 4.5 kg (10 lb)

Lot size (N)	Sample size (n)	Acceptance no. (c)
600 or less	13	2
601 –2,000	21	3
2,001 – 7,200	29	4
7,201 – 15,000	48	6
15,001 – 24,000	84	9
24,001 – 42,000	126	13
More than 42,000	200	19

Annex 4

Explanatory notes on acceptance sampling

1 Sampling

Sampling is the process of drawing or selecting containers or sample units from a lot or production. As a result of sampling, information is obtained by which an estimate can be made to accept, reject or negotiate the merchandise in question. Sampling procedures which contain both sample size and acceptance criteria are commonly referred to as "acceptance sampling".

There are many types of acceptance sampling systems in use today. A plan that is suitable for one product or type of inspection may be entirely unsuitable for another product or inspection system. The plan selected is determined to a large extent by the degree to which it satisfies the needs of the user.

In developing these acceptance sampling plans, initial consideration has been given to quality evaluation of the end product. This requires opening of containers with resultant loss of products. This type of inspection is referred to as "destructive sampling". Not only is the loss of product an important consideration, but also destructive sampling is generally quite time consuming. Consequently, both inspection time and economic loss of product through destructive inspection are significant limiting factors in developing sampling plans for the quality evaluation of processed foods. Sample size must necessarily be relatively small in order to make the plan practical in application.

2 Risks

The aim of any sampling plan should be to accept more "good" lots and reject more "bad" lots. Since probability and chance are involved, decisions will, of necessity, involve an element of risk. This risk factor has to be accepted as a part of any sampling procedure. One method of reducing the buyer's risk of accepting deliveries of non-conforming quality is to increase sample size. In other words, the larger the sample, the less risk involved in accepting "bad" lots. Inspection level is the term indicating the relative amount of sampling and inspection performed on lots of a given product or class of products. If the inspection lot is packed under close control and meets the requirements of the Codex Standard, changing inspection levels do not appreciably change the buyer-seller risk. In other words, this would be a "good" lot and should be passed practically all of the time by a good sampling plan. The effectiveness of a sampling plan in discriminating between "good" and "bad" lots can be estimated by examination of the OC curves (see Appendix III) for the various sample sizes. For example, if a lot is produced so that it does not contain more than 6.5 percent defectives, such lot will be passed at least 95 percent of the time by the sampling plans applicable for an AQL of 6.5. On the other hand, if the production contains an appreciable amount of defective material, a higher inspection level (i.e. a larger sample size) will reduce the risk of accepting these non-conforming lots. The effect of increased sample size is explained in greater detail under the discussion of OC curves.

3 AQL

One of the initial considerations in the development of a statistical acceptance sampling plan is the selection of an appropriate AQL or Acceptable Quality Level. This characteristic is defined as the maximum percent defective units in lots that will be accepted most of the time (approximately 95 percent of the time). Lots or production containing more defective material will be accepted less often - the ratio of rejection to acceptance increasing as the sample size increases and as the percent defective material in the lot increases.

In developing these sampling plans, an AQL of 6.5 was selected for lot acceptance with respect to quality evaluation. In other words, an AQL of 6.5 is used in these sampling plans (Appendix I) to determine whether or not the inspection lot meets minimum quality requirements of the Codex Standard. This value was selected on the basis of years of experience and the capability of industry to produce preserved fruits and vegetables and certain other processed foods at this level under good commercial practice. For other factors (such as Brix value and net weight) other AQLs may be selected. Sampling plans can be drawn up for a full range of AQLs from a very strict value of 0.10 to a rather lenient value of 25.0 and higher, depending either on the type of product and/or on the criteria involved.

4 Inspection level

These sampling plans provide for two inspection Levels I and II. These two levels provide some discretion in the application of the Sampling Plans to the inspection of a commodity, depending upon circumstances. For normal trading purposes Level I is recommended. In the case of dispute or controversy, i.e. for Codex referee purposes, Level II is recommended. Smaller sample sizes than those provided by Levels I and II may be justified, e.g. when a delivery is being checked for labeling or for detection of non-permitted additives. However, the acceptance sampling criteria of the plans, which permit 6.5 percent "defectives", do not apply to such an inspection.

5 OC Curves

The problem of buyer's and seller's risks in relation to sample size and lot quality is illustrated through the use of operating characteristic curves (OC Curves). Appendix III contains OC Curves for the sampling plans contained in Appendix I of this document. For purposes of destructive inspection sample sizes in excess of 84 are not practical, since any further inspection beyond this point will not generally provide sufficient additional data to warrant the time and expense of testing.

In studying the OC Curves for AQL 6.5 several conclusions can be drawn, namely:

1. All of the curves have the same general slope although the curve for sample size 6 is flatter.
2. All curves intersect at a point represented by the coordinates of "6.5 percent defective" and approximately "95 percent probability of acceptance".
3. As the sample size increases, the curved become steeper and more discriminating, i.e. lots having "defectives" in excess of 6.5 percent are rejected with greater frequency.

4. The reliability of the larger sample size is not in direct proportion to the increased sample. For example, for a lot that is 20 percent defective a sample size of 6 (curve E) will accept such lot 65 percent of the time; whereas a sample size of 48 (curve L) will accept the same lot 22 percent of the time. In this example the ratio between probabilities of acceptance is only 3 to 1.

   To illustrate the use of the OC Curves (AQL 6.5) let it be assumed that a lot is 10 percent defective. A lot with 6.5 percent defectives will be accepted 95 percent of the time, the frequency of acceptance increasing as the percent defective decreases. However, the 10 percent defective lot fails to measure up to requirements, and while it may be a marginal lot, it may not be acceptable. An examination of the OC curves shows that a sample size of 6 (curve E) will accept this marginal lot 88 percent of the time; a sample size of 84 (curve M) is somewhat better, accepting the lot 65 percent of the time.

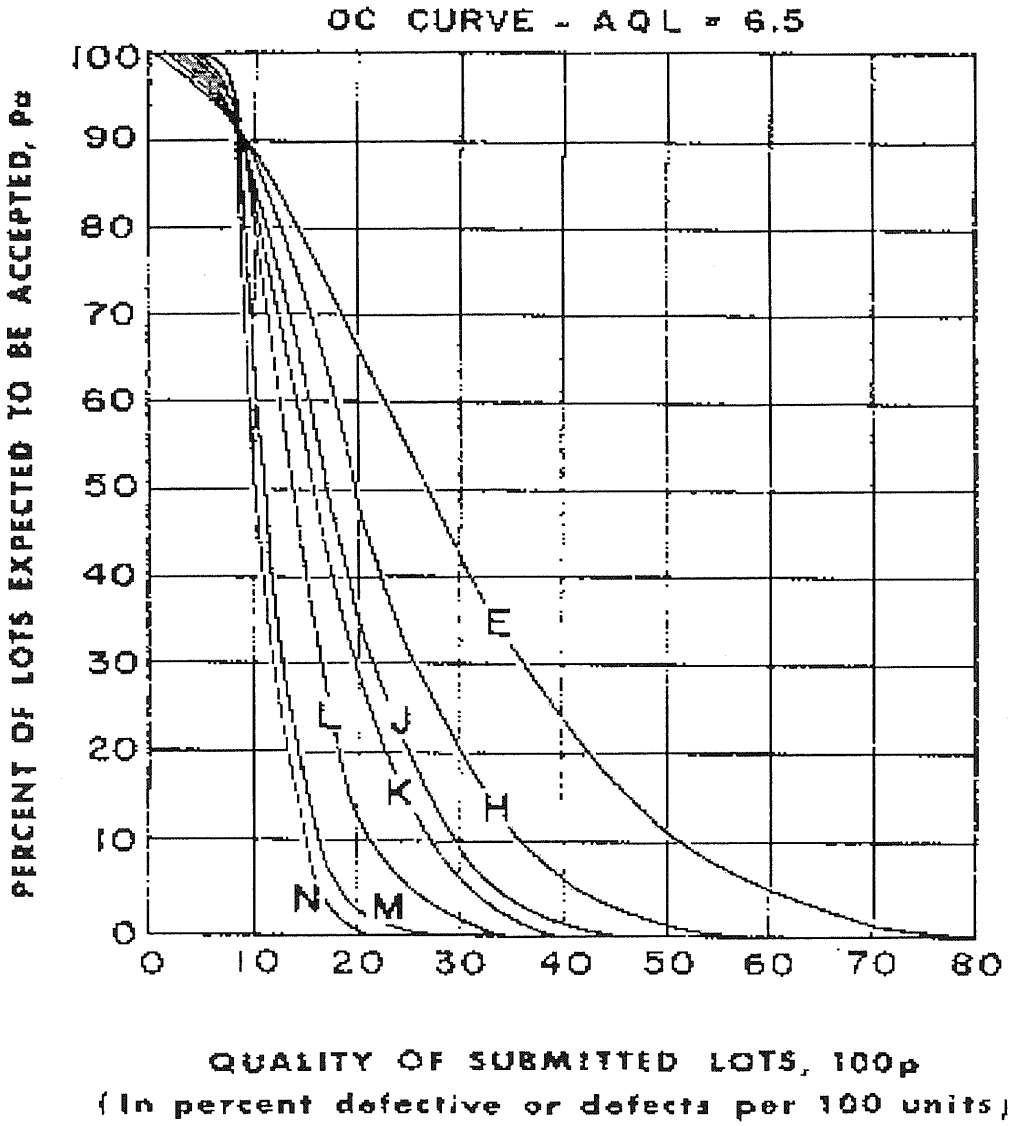
   If on the other hand, the lot is 30 percent defective, a sample size of 6 (curve E) will accept the lot only 42 percent of the time, whereas a sample size of 21 (curve J) will accept such a lot only 8 percent of the time and a sample size of 84 (curve M) will always fail such a lot.

Annex 5

OPERATING CHARACTERISTIC CURVES

AQL = 6.5

Identification letter of OC curve																				
E			H			J			K			L			M			N		
n	c	r	n	c	r	n	c	r	n	c	r	n	c	r	n	c	r	n	c	r
6	1	2	13	2	3	21	3	4	29	4	5	48	6	7	84	9	10	126	13	14



Annex 6

Determination of lead by the Atomic absorption spectrophotometric method

1 Apparatus

(a) Atomic absorption spectrophotometer. – Operated at 217 nm or 283.3 nm
(b) Stirring motor. – With eccentric coupling for stirring centrifuge tubes.

2 Reagents

(a) Strontium solution. – 2%. Dissolve 6 g $SrCl_2.6H2O$ in 100 ml water.
(b) Ternary acid mixture. – Add 20 ml H_2SO_4 to 100 ml water, mix, add 100 ml HNO_3 and 40 ml $HClO_4$, and mix.
(c) Nitric acid. – Add 128 mL redistilled HNO_3 to 500 mL - 800 mL distilled or deionized water and dilute to 2 L. Redistilled HNO_3 may be diluted and used without redistillation.
(d) Lead standard solutions. – (1) Stock solution. – 1000 mg/mL. Dissolve 1.5985 g $Pb(NO_3)_2$, recrystallized in ca 500 mL 1 N HNO_3 in 1 L volumetric flask and dilute to volume with 1 N HNO_3. (2) Working solutions. – Prepare 100 mg Pb/mL by diluting 10 mL stock solution to 100 mL with 1 N HNO_3. Dilute 1, 3, 5, 10, 15 and 25 mL aliquots of this solution to 100 mL with 1 N HNO_3 (1, 3, 5, 10, 15 and 25 mg Pb/mL, respectively).

3 Separation of lead

3.1 Accurately weigh sample containing 10 g dry matter and 3 mg Pb. Place in 500 ml boiling or Kjedhal flask and add 1 mL 2% Sr solution, and several glass beads. Prepare reagent blank and carry through same operations as sample. Add 15 mL ternary acid mixture, for each dry matter and let stand for 2 hours. Heat under hood or water vacuum manifold system until flask contains only H_2SO_4 and inorganic salts.

3.2 Cool digest for 1 few minutes. (Digest should be cool enough to add ca 15 ml water safely, but hot enough to boil when water is added.) Wash while still hot into 40-50 mL tapered-bottom centrifuge tube and swirl. Let cool, centrifuge 10 minutes at 350 x g, and decant liquid into waste beaker. (Film-like precipitate on surface may be discarded.) Dislodged precipitate by vigorously stirring with eccentric-coupled stirring motor. To complete transfer, add 20 mL water and 1 mL 1 N H_2SO_4 to original flask and heat. Do not omit this step even though it appears transfer was complete in first wash. Wash hot contents of original digestion flask into centrifuge tube containing precipitate. Swirl to mix, cool, centrifuge and decant liquid into waste beaker.

3.3 Dislodged precipitate by stirring vigorously, add 25 mL saturated $(NH4)_2CO_3$ solution (ca 20%) and stir until all precipitate is dispersed. Let stand for 1 hour, centrifuge and decant liquid into waste beaker. Repeat $(NH4)_2CO_3$ treatment.

3.4 After decanting, invert centrifuge tube on paper towel and drain all liquid. Add 5 mL HNO_3 (use larger volume 1 N HNO_3 in both sample and blank if >25 mg Pb is expected), stir vigorously to expel CO_2 or use ultrasonic bath for 2 minutes - 3 minutes, let stand for 30 minutes and centrifuge if precipitate remains.

4 Determination

Set instrument to previously established optimum conditions, using air-C_2H_2 oxidizing flame and 217 nm or 283.3 nm resonant wavelength. Determine A of sample and blank solutions and 5 standards within the optimum working range (10% - 80% T) before and after sample readings. Flush burner with 1 N HNO_3 and check 0 point between readings. Determine lead from standard curve of A against mg Pb/mL:

ppm Pb = [(mg Pb/mL) x (mL 1 N HNO_3)] / g sample

Annex 7

Determination of Tin by the Atomic Absorption Spectrophotometric Method

1 Reagents and apparatus

(a) Atomic absorption spectrophotometer. – With simultaneous background correction and N_2O-C_2H_2 burner.

(b) Tin standard solutions. – (1) Stock solution. – 1 mg Sn/mL. Dissolve 1.000 g Sn (reagent grade) in ca 200 mL concentrated HCl. Add ca 200 mL water, cool to ambient temperature, and dilute to 1 L with water. (2) Working solutions. – 0 mg Sn/mL, 50 mg Sn/mL, 100 mg Sn/mL, 150 mg Sn/mL, and 200 mg Sn/mL. Into each of five 100 mL volumetric flasks, pipette 10 mL concentrated HCl, 1.0 mL KCl solution, and 0 mL Sn, 5 mL Sn, 10 mL Sn, 15 mL Sn or 20 mL Sn stock solution. Dilute to volume with water.

(c) Potassium chloride solution. – 10 mg K/mL. Dissolve 1.91 g KCl and dilute to 100 mL with water.

(d) Nitric acid. - Concentrated. Test purity by diluting portion 1:4 volume/volume with water and aspirating into AA spectrophotometer. Absence of Sn signal indicates suitability for analysis.

2 Preparation of samples

2.1 Accurately weigh (±0.01 g) sample into 250 mL Erlenmeyer: 20 g foods containing 50% - 75% water, and 5 g - 10 g solids or semi-solids. Dry in oven at 120°.

2.2 Do not add HNO_3 to samples unless there is time to complete this stage of digestion in the same day. Add 30 mL concentrated HNO_3 to flask and, within 15 minutes, heat gently in hood to initiate digestion, avoiding excessive frothing. Gently boil until 3 mL - 6 mL digest remains or until sample just begins to dry on bottom. Do not let sample char. Remove flask from heat. Without delay, continue as follows, including 2 empty flasks for reagent blanks: Add 25 mL concentrated HCl, and heat gently ca 15 minutes until sample bumping from evolution of Cl_2 stops. Increase heat, and boil until 10 mL -15 mL volume remains, using similar flask with 15 mL water to estimate volume. Add ca 40 mL water, swirl and pour into 100 mL volumetric flask, rinsing once with ca 10 mL water. When HCl is present in digest, samples may stand overnight or longer.

2.3 Pipette 1.0 mL KCl solution into each volumetric flask. Cool to ambient temperature and dilute to volume with water, adding more water to approximately compensate for volume of fat in flask. Mix well and filter ca 30 mL - 50 mL through dry, medium porosity paper into dry, polypropylene or polyethylene screw-cap bottle. Do not filter blanks. Cap bottles until analysis. Solutions are stable several months.

3 Determination

3.1 Using 200 mg/mL standard and 235.5 nm Sn line, optimize spectrophotometer, burner and flame according to manufacturer's instructions. Then increase N_2O flow or decrease C_2H_2 flow to give oxidizing flame; red part should be ca 4 mm above burner slot. This reduces sensitivity but improves precision to 0 ±0.0004 A for blank and 0.201 ±0.001 A for mg/mL. Periodically monitor sensitivity decreases >20%, turn off flame and carefully clean burner slot.

3.2 Zero spectrophotometer while aspirating water but do not adjust zero until after determinations; autozero reduces precision. Aspirate water before and after each sample, standard and blank solution. Take three 5 s readings for each solution, average and reference all A measurement to A of water.

3.3 Record A for standards, draw calibration curve, and visually check for inaccurate standards. Two times blank-corrected A for 50 mg/mL standard should differ by more than 3% from blank-corrected A for 100mg/mL standard.

3.4 Block standard blank with 50 mg/mL standard, using ratio of A, calculate concentration of standard blank:

$$\textbf{Standard blank (mg/mL)} = [A_o/(A' - A_o)] \times 50$$

Where A' and A_o refer to blank and mean of readings for 50 mg/mL blocking standard, respectively.

3.5 Add standard blank concentration to nominal standard concentrations to obtain true standard concentrations.

3.6 Measure A of sample blanks as for standard blank and calculate:

$$\textbf{Sample blank (mg/mL)} = (A_o/A') \times \textbf{true concentration of 50 mg/mL standard}$$

Where A_o and A' refer to blank and 50 mg/mL standard, respectively. Calculate mean concentration of sample blanks, B.

3.7 Determine sample solution concentrations by one of 2 ways: (1) Measure A of sample solutions (maximum 3 samples) and 50 mg/mL standard, (or 100 mg/mL standard, depending on sample concentration level), blocking samples with standards. Calculate blank-corrected sample solution concentrations:

$$\textbf{Sample concentration (mg/mL)} = (A/A' \times \textbf{true standard concentration}) - B$$

Where A and A' refer to sample and standard, respectively.

3.8 When high accuracy is not required or when calibration curvature is extensive, use procedure (1) after confirmation that sensitivity changes and baseline drift are absent during analytical run. (2) Calibrate using blank and 50, 100 and 150 mg/mL standards. Run sample blanks and samples, and calculate solution concentrations using either instrument microprocessor or calibration curve. Calculate mean of sample blank

concentrations, B. Calculate blank-corrected solution concentrations (mg/mL) by subtracting B from solution concentrations.
For both (1) and (2), calculate sample concentrations:

$$\text{Sample (mg/g)} = \frac{[\text{blank-corrected solution concentration}}{\text{Sample weight (g)}} \times 100$$

Annex 8

Determination of drained weight

1 Apparatus and sieves

(a) Balance with capacity of 2 kg and sensitivity of 0.1 g
(b) Sieves use 20 cm (8") diameter for containers 1.36 kg (3 lb) or 30 cm (12") diameter for containers 1.36 kg (3 lb).

2 Determination

2.1 Weigh full can, open and pour entire contents on NO. 8 sieve.

2.2 Without shifting product, incline sieve at ca 17° - 20° to facilitate drainage.

2.3 Drain for 2 minutes, directly weigh either drained solids or free liquid and weigh dry empty can.

2.4 From weights obtained, determine % liquid and % drained solid contents.

Annex 9

Determination of net weight and washed drained weight

A Determination of net weight

a) Net contents of all sample units shall be determined by the following procedure:
b) Weigh the unopened container.
c) Open the container and remove the contents.
d) Weigh the empty container, (including the end) after removing excess liquid and adhering meat.
e) Subtract the weight of the empty container from the weight of the unopened container. The resultant figure will be the net content.

B Determination of washed drained weight (For packs with sauces)

a) Maintain the container at a temperature between 20°C and 30°C for a minimum of 12 hours prior to examination.
b) Open and tilt the container and wash the covering sauce and then the full contents with hot tap water (approximately 40°C), using a wash bottle (e.g. plastic) on the tared circular sieve.
c) Wash the contents of the sieve with hot water until free of adhering sauce; where necessary separate optional ingredients (spices, vegetables, fruits) with pincers. Incline the sieve at an angle of approximately 17° - 20° and allow the fish to drain two minutes, measured from the time the washing procedure has finished.
d) Remove adhering water from the bottom of the sieve by use of paper towel. Weigh the sieve containing the washed drained fish.
e) The washed drained weight is obtained by subtracting the weight of the sieve from the weight of the sieve and drained product.

3 Determination

3.1 Using 200 mg/mL standard and 235.5 nm Sn line, optimize spectrophotometer, burner and flame according to manufacturer's instructions. Then increase N_2O flow or decrease C_2H_2 flow to give oxidizing flame; red part should be ca 4 mm above burner slot. This reduces sensitivity but improves precision to 0 ±0.0004 A for blank and 0.201 ±0.001 A for mg/mL. Periodically monitor sensitivity decreases >20%, turn off flame and carefully clean burner slot.

3.2 Zero spectrophotometer while aspirating water but do not adjust zero until after determinations; autozero reduces precision. Aspirate water before and after each sample, standard and blank solution. Take three 5 s readings for each solution, average and reference all A measurement to A of water.

3.3 Record A for standards, draw calibration curve, and visually check for inaccurate standards. Two times blank-corrected A for 50 mg/mL standard should differ by more than 3% from blank-corrected A for 100mg/mL standard.

3.4 Block standard blank with 50 mg/mL standard, using ratio of A, calculate concentration of standard blank:

$$\textbf{Standard blank (mg/mL)} = [A_o/(A' - A_o)] \times 50$$

Where A' and A_o refer to blank and mean of readings for 50 mg/mL blocking standard, respectively.

3.5 Add standard blank concentration to nominal standard concentrations to obtain true standard concentrations.

3.6 Measure A of sample blanks as for standard blank and calculate:

$$\textbf{Sample blank (mg/mL)} = (A_o/A') \times \textbf{true concentration of 50 mg/mL standard}$$

Where A_o and A' refer to blank and 50 mg/mL standard, respectively. Calculate mean concentration of sample blanks, B.

3.7 Determine sample solution concentrations by one of 2 ways: (1) Measure A of sample solutions (maximum 3 samples) and 50 mg/mL standard, (or 100 mg/mL standard, depending on sample concentration level), blocking samples with standards. Calculate blank-corrected sample solution concentrations:

$$\textbf{Sample concentration (mg/mL)} = (A/A' \times \textbf{true standard concentration}) - B$$

Where A and A' refer to sample and standard, respectively.

3.8 When high accuracy is not required or when calibration curvature is extensive, use procedure (1) after confirmation that sensitivity changes and baseline drift are absent during analytical run. (2) Calibrate using blank and 50, 100 and 150 mg/mL standards. Run sample blanks and samples, and calculate solution concentrations using either instrument microprocessor or calibration curve. Calculate mean of sample blank

concentrations, B. Calculate blank-corrected solution concentrations (mg/mL) by subtracting B from solution concentrations.
For both (1) and (2), calculate sample concentrations:

$$\text{Sample (mg/g)} = \frac{[\text{blank-corrected solution concentration}}{\text{Sample weight (g)}} \times 100$$

Annex 8

Determination of drained weight

1 Apparatus and sieves

(a) Balance with capacity of 2 kg and sensitivity of 0.1 g
(b) Sieves use 20 cm (8") diameter for containers 1.36 kg (3 lb) or 30 cm (12") diameter for containers 1.36 kg (3 lb).

2 Determination

2.1 Weigh full can, open and pour entire contents on NO. 8 sieve.

2.2 Without shifting product, incline sieve at ca 17° - 20° to facilitate drainage.

2.3 Drain for 2 minutes, directly weigh either drained solids or free liquid and weigh dry empty can.

2.4 From weights obtained, determine % liquid and % drained solid contents.

Annex 9

Determination of net weight and washed drained weight

A Determination of net weight

a) Net contents of all sample units shall be determined by the following procedure:
b) Weigh the unopened container.
c) Open the container and remove the contents.
d) Weigh the empty container, (including the end) after removing excess liquid and adhering meat.
e) Subtract the weight of the empty container from the weight of the unopened container. The resultant figure will be the net content.

B Determination of washed drained weight (For packs with sauces)

a) Maintain the container at a temperature between 20°C and 30°C for a minimum of 12 hours prior to examination.
b) Open and tilt the container and wash the covering sauce and then the full contents with hot tap water (approximately 40°C), using a wash bottle (e.g. plastic) on the tared circular sieve.
c) Wash the contents of the sieve with hot water until free of adhering sauce; where necessary separate optional ingredients (spices, vegetables, fruits) with pincers. Incline the sieve at an angle of approximately 17° - 20° and allow the fish to drain two minutes, measured from the time the washing procedure has finished.
d) Remove adhering water from the bottom of the sieve by use of paper towel. Weigh the sieve containing the washed drained fish.
e) The washed drained weight is obtained by subtracting the weight of the sieve from the weight of the sieve and drained product.

Annex 10

Determination of presentation

1 The presentation of all sample units shall be determined by the following procedure.

1.1 Open the can and drain the contents.

1.2 Remove and place the contents onto a tared 1.2 cm mesh screen equipped with a collecting pan.

1.3 Separate the fish with a spatula being careful not to break the configuration of the pieces.

Ensure that the smaller pieces of fish are moved to the top of a mesh opening to allow them to fall through the screen onto the collecting pan.

1.4 Segregate the material on the pan according to flaked, grated (shredded) or paste and weigh the individual portions to establish the weight of each component.

1.5 If declared as a "chunk" pack weigh the screen with the fish retained and record the weight.

Subtract the weight of the sieve from this weight to establish the weight of solid and chunk fish.

1.6 If declared as "solid" pack, remove any small pieces (chunks) from the screen and reweigh.

Subtract the weight of the sieve from this weight to establish the weight of "solid" fish.

2 Calculations

2.1 Express the weight of flaked, grated (shredded and paste) as a percentage of the total drained weight of fish.

$$\%\text{flakes} = \frac{\text{Total weight of drained fish}}{\text{Weight of flakes}} \times 100$$

2.2 Calculate the weight of solid and chunk fish retained on the screen by difference and express as a % of the total drained weight of fish.

$$\%\text{solid \& chunk fish} = \frac{\text{Total weight of drained fish}}{\text{Weight of solid \&chunk fish}} \times 100$$

2.3 Calculate the weight of solid fish retained on the screen by difference and express as a % of the total drained weight of the fish.

$$\%\text{of solid fish} = \frac{\text{Total weight of drained fish}}{\text{Weight of solid fish}} \times 100$$

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3. Ms. Almueda C. David	-	Food & Drug Regulation Officer IV
4. Ms. Charina May T. Tandas	-	Food & Drug Regulation Officer III
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